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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/553,945	10/21/2005	Tetsuya Kamihara	040302-0502	5799
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FOLEY AND LARDNER LLP SUITE 500 3000 K STREET NW WASHINGTON, DC 20007			EXAMINER WANG, EUGENIA	
			ART UNIT 1795	PAPER NUMBER
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/553,945	<b>Applicant(s)</b> KAMIHARA, TETSUYA	
	<b>Examiner</b> EUGENIA WANG	<b>Art Unit</b> 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 October 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. ____.                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>10/21/05, 12/20/05</u> .                                      | 6) <input type="checkbox"/> Other: ____.                          |

## **DETAILED ACTION**

### ***Priority***

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### ***Information Disclosure Statement***

2. The information disclosure statements filed October 21, 2005 and December 20, 2005 have been placed in the application file and the information referred to therein has been considered as to the merits.

### ***Claim Interpretation***

3. Although incorporation of reference numbers into the claim is permitted, the reference characters have no effect on the scope of the claim. See MPEP 608.01(m) and MPEP 2173.05(s).

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 7, and 8-13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 7 states that there is "a control unit" (line 4). However, claim 1, which claim 7 is dependent on, previously states "a control unit" (line 8). Accordingly it is unclear whether or not the same control unit is being relied upon in claim 7 or whether the control unit in claim 7 is different from that of claim 1. Thus, the term "control unit" is seen to be over-defined and is thus indefinite. Since

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claims 8-13 are dependent on claim 7 and fail to rectify the issue, they are rejected for the same reason.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
  2. Ascertaining the differences between the prior art and the claims at issue.
  3. Resolving the level of ordinary skill in the pertinent art.
  4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
5. Claims 1-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 2003/0003335 (Kazama et al.) in view of US 2004/0001985 (Alva).

As to claim 1, Kazama et al. teach of a fuel cell stack [1] that generates electric power and provides it to a load [9] (for example a drive source) (para 0027; fig. 1). Although not specifically shown in the figures, Kazama et al. teach of the presence of a cooling unit that supplies coolant to the stack, wherein there the temperature of the coolant is measured by a temperature sensor (see step 32 of fig. 12; para 0088). Furthermore, Kazama et al.'s system calculates the electric power that can be generated from the fuel cell via the temperature of the coolant, compares it to the

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amount that is generated and adjusts the flows of the oxidant and fuel gas based off of that (figs. 11-13; para 0089-0094). It is noted that such processes are done via control unit [10], whose functional constitution is shown in fig. 2, and thus the items which have inputs into the control algorithm are linked to the control system (i.e. the temperature sensor). Furthermore, as seen in fig. 1, the control unit, as seen in fig. 1, also controls the flow of fuel (via pressure control valve [3] through S1), the flow of oxidant (via motor [5] through S2 and pressure control valve [6] through S3), and the power control unit [7] through S4), wherein the controller [10] can set a target power generation amount (fig. 1-2; para 0030; para 0032).

Kazama et al. does not specifically teach that the temperature sensor of the coolant is on the inlet of the coolant.

However Alva teaches that coolant parameters such as temperature sensors on both the inlet (inlet temperature detecting unit) and outlet of the fuel cell [10] (in order to tell how much heat is removed from the fuel cell) as well as the flow rate of the coolant, wherein such parameters will in turn be sent to a processor (control unit), which will control operation of the components of the system (para 0034). The motivation for wanting to provide such sensors with respect to the fuel cell is in order to more effectively control the system as to the needs of the fuel cell (via the circulation pump speeds and fan speeds to provide the appropriate amount of cooling/heating) (as set forth in para 0034). Therefore it would have been obvious to one having ordinary skill in the art at the time the claimed invention was made to provide sensors (temperature sensors on the inlet and outlet of the fuel cell, as well as a flow control sensor) in order

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to better monitor the cooling system with respect to the fuel cell and to provide better control as with respect to the fuel cell needs.

It is noted that the combination of Kazama et al. and Alva yields the same structure of the claimed invention (as Kazama et al. teaches of having a fuel cell, a cooling unit to deliver coolant to the fuel cell, and power management system that controls target power generation connected to a control unit and Alva is relied upon to render obvious the connection of temperature sensors and flow meters to a control unit to control heating/cooling (via pumps and fans). Accordingly, since the structure of the combination is the same as that of the instant application's structure, it is seen to capable of operating (and thus "configured to" operate) in the same manner (i.e. such that the control unit controls the electric power or current extracted from the fuel cell stack in accordance with the coolant temperature unit detected by the inlet temperature detecting unit).

It has been held that the recitation of an element is "capable" of performing a function is not a positive limitation but only requires the ability to so perform. It does not constitute a limitation in any patentable sense. *In re Hutchinson*, 69 USPQ 138.

While intended use recitations and other types of functional language cannot be entirely disregarded. However, in apparatus, article, and composition claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In a claim drawn to a process of making, the intended use must result in a manipulative difference

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as compared to the prior art. In re Casey, 370 F.2d 576, 152 USPQ 235 (CCPA 1967); In re Otto, 312 F.2d 937, 938, 136 USPQ 458, 459 (CCPA 1963).

Claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. In re Danly, 263 F.2d 844, 847, 120 USPQ 528, 531 (CCPA 1959). See also MPEP § 2114.

The manner of operating the device does not differentiate an apparatus claim from the prior art. A claim containing a “recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus” if the prior art apparatus teaches all the structural limitations of the claim. Ex parte Masham, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987).

As to claim 2, the combination of Kazama and Alva, which has the same structure as the claimed invention, is capable of operating in a manner such that the control unit sets the limit value of the electric power or electric current extracted from the fuel cell stack in such a manner that the higher said coolant temperature becomes, the lower said limit value is set. Please see the rejection of claim 1 as to the Office’s position on functional language as applied to apparatuses capable of performing the same function.

As to claim 3, the combination of Kazama and Alva, which has the same structure as the claimed invention, is capable of operating in a manner such that the control unit sets said limit value to a fixed value until the coolant temperature reaches a prescribed temperature and lowers the limit value when the coolant temperature

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exceeds the prescribed temperature. Please see the rejection of claim 1 as to the Office's position on functional language as applied to apparatuses capable of performing the same function.

As to claim 4, the combination of Kazama and Alva, which has the same structure as the claimed invention, is capable of operating in a manner such that when said coolant temperature exceeds the prescribed value, the control unit sets said limit value in such a manner that the extracted current becomes lower as said coolant temperature becomes higher. Please see the rejection of claim 1 as to the Office's position on functional language as applied to apparatuses capable of performing the same function.

As to claim 5, the combination of Kazama and Alva, which has the same structure as the claimed invention, is capable of operating in a manner such that the control unit (1) receives the coolant temperature detected by the inlet temperature detecting unit, (2) obtains a maximum electric current allowed to be extracted from the fuel cell stack based on said coolant temperature, (3) compares a requested electric current to the maximum current allowed to be extracted, and (4) selects the smaller of the compared electric currents. Please see the rejection of claim 1 as to the Office's position on functional language as applied to apparatuses capable of performing the same function.

As to claim 6, the combination of Kazama and Alva, which has the same structure as the claimed invention, is capable of operating in a manner such that the control unit (1) receives the coolant temperature detected by the inlet temperature



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detecting unit, (2) calculates an allowable value for the coolant temperature difference between the inlet and outlet of the fuel cell stack based on said coolant temperature, (3) estimates the coolant temperature difference between the inlet and outlet of the fuel cell stack based the allowable value for the coolant temperature difference between the inlet and outlet of the fuel cell stack, (4) obtains a maximum electric current allowed to be extracted from the fuel cell stack based on the coolant temperature difference between the inlet and outlet of the fuel cell stack, (4) compares a requested electric current to the maximum current allowed to be extracted, and (5) selects the smaller of the compared electric currents. (It is noted that Alva renders obvious a coolant inlet temperature hooked up to a processor (control unit), wherein the control unit is capable of operating in the aforementioned manner.) Please see the rejection of claim 1 as to the Office's position on functional language as applied to apparatuses capable of performing the same function.

As to claim 7, the combination of Kazama et al. and Alva has the same structure as the invention claimed, since Alva's coolant inlet temperature sensor as connected to the processor (control unit) (as rendered obvious in claim 1) is seen to be provide all that is necessary for an outlet estimating unit (as the control unit would be capable of doing such estimation). Accordingly, it is seen as being capable of operating in the same manner, such that the control unit (controls the electric power or electric current extracted from the fuel cell stack in accordance with the temperature of the coolant at the outlet of the fuel cell stack estimated by the outlet temperature estimating unit).

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Please see the rejection of claim 1 as to the Office's position on functional language as applied to apparatuses capable of performing the same function.

As to claim 8, the combination of Kazama et al. and Alva has the same structure of the claimed invention, since Alva is relied upon to teach a coolant flow rate detector (as rendered obvious in claim 1). Accordingly, it is seen as being capable of operating in the same manner (such that the control unit estimates the rate at which heat is transferred from the stack to the coolant). Please see the rejection of claim 1 as to the Office's position on functional language as applied to apparatuses capable of performing the same function.

As to claim 9, the combination of Kazama and Alva, which has the same structure as the claimed invention, is capable of operating in a manner such that the outlet temperature estimating unit (control unit, as connected to the peripheral extensions, as set forth in the rejection to claim 1) estimates the coolant temperature at the outlet of the fuel cell stack based on the coolant flow rate detected by the coolant flow rate detecting unit and the heat removal rate estimated by the heat removal rate estimating unit. Please see the rejection of claim 1 as to the Office's position on functional language as applied to apparatuses capable of performing the same function.

As to claim 10, the combination of Kazama and Alva, which has the same structure as the claimed invention, is capable of operating in a manner such that the heat removal rate estimating unit (control unit, as connected to the peripheral extensions, as set forth in the rejection to claim 1) estimates the heat removal rate based on the electric power or electric current extracted from the fuel cell stack. Please

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see the rejection of claim 1 as to the Office's position on functional language as applied to apparatuses capable of performing the same function.

As to claim 11, the combination of Kazama and Alva, which has the same structure as the claimed invention, is capable of operating in a manner such that the heat removal rate estimating unit (control unit, as connected to the peripheral extensions, as set forth in the rejection to claim 1) estimates the heat removal rate based on the electric power or electric current extracted from the fuel cell stack and the output voltage of the fuel cell stack. Please see the rejection of claim 1 as to the Office's position on functional language as applied to apparatuses capable of performing the same function.

As to claim 12, the combination of Kazama et al. and Alva has the same structure as the invention claimed, since Alva renders obvious the use of a coolant outlet temperature sensor as connected to the processor (control unit) (as rendered obvious in claim 1).

As to claim 13, the combination of Kazama et al. and Alva has the same structure as the invention claimed, since Alva renders obvious the use of a coolant outlet temperature sensor (indicative of stack temperature and thus serves as a stack temperature detecting unit as well) (as rendered obvious in claim 1). Accordingly, it is seen as being capable of operating in the same manner the heat removal rate estimating unit (control unit, as connected to the peripheral extensions) estimates the heat removal rate based on the electric power or electric current extracted from the fuel cell stack and the temperature of the fuel cell stack detected by the stack temperature

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detecting unit. Please see the rejection of claim 1 as to the Office's position on functional language as applied to apparatuses capable of performing the same function.

As to claim 14, the combination of Kazama et al. and Alva has the same structure as the invention claimed, since Alva renders obvious the use of a coolant inlet and outlet temperature sensors as well as flow rate sensors to control the pumps (which controls the flow rate) by using a processor (control unit), thus constituting a coolant flow rate setting unit (as rendered obvious in claim 1). Accordingly it is capable of operating in such a manner that at least in a high load region of the fuel cell, the difference between the coolant temperature at the inlet of the fuel cell stack and the estimated coolant temperature at the outlet of the fuel cell stack increases as the output of the fuel cell increases.

As to claim 15, the combination of Kazama et al. and Alva has the same structure as the invention claimed, since Alva renders obvious the use of a coolant outlet temperature sensor (as rendered obvious in claim 1).

As to claim 16, the combination of Kazama and Alva, which has the same structure as the claimed invention, is capable of operating in a manner such that control unit (as connected to the peripheral extensions, as set forth in the rejection to claim 1) limits the electric power or electric current extracted from the fuel cell stack when the temperature detected by the outlet temperature detecting unit exceeds a prescribed value. Please see the rejection of claim 1 as to the Office's position on functional language as applied to apparatuses capable of performing the same function.

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As to claim 17, the combination of Kazama and Alva, which has the same structure as the claimed invention, is capable of operating in a manner such that when the coolant temperature is rising, the control unit sets said prescribed value in such a manner that the electric power or electric current extracted from the fuel cell stack is limited based on the temperature of the coolant at the inlet of the fuel cell stack before it is limited based on the temperature of the coolant at the outlet of the fuel cell stack while the coolant temperature rises. Please see the rejection of claim 1 as to the Office's position on functional language as applied to apparatuses capable of performing the same function.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to EUGENIA WANG whose telephone number is (571)272-4942. The examiner can normally be reached on 7 - 4:30 Mon. - Thurs., EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/E. W./

Examiner, Art Unit 1795

/PATRICK RYAN/

Supervisory Patent Examiner, Art Unit 1795